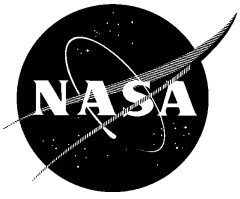
Standard Payload Integration Agreement for Pressurized Payloads

International Space Station Program

Baseline

August 2001

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas



REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (Reference per SSCD 005668, EFF. 09-19-01)	10-04-01

SSP 57059
Baseline

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

CHANGE SHEET

October 4, 2001

Baseline

Space Station Control Board Directive 005668/(1-1), dated 09-19-01. (1)

CHANGE INSTRUCTIONS

SSP 57059, Standard Payload Integration Agreement for Pressurized Payloads, has been baselined by the authority of SSCD 005668. All future updates to this document will be identified on this change sheet.

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

Baseline (Reference SSCD 005668, dated 09-19-01)

LIST OF EFFECTIVE PAGES

October 4, 2001

The current status of all pages in this document is as shown below:

Page	Change No.	SSCD No.	Date
i - vi	Baseline	005668	September 19, 2001
1-1 - 1-4	Baseline	005668	September 19, 2001
2-1 - 2-6	Baseline	005668	September 19, 2001
3-1 - 3-4	Baseline	005668	September 19, 2001
4-1 - 4-3	Baseline	005668	September 19, 2001
5-1 - 5-4	Baseline	005668	September 19, 2001
6-1 - 6-5	Baseline	005668	September 19, 2001
7-1 - 7-6	Baseline	005668	September 19, 2001
8-1	Baseline	005668	September 19, 2001
A-1 - A-5	Baseline	005668	September 19, 2001
B-1 - B-5	Baseline	005668	September 19, 2001
C-1 - C-2	Baseline	005668	September 19, 2001
D-1 - D-10	Baseline	005668	September 19, 2001

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

AUGUST 2001

FOREWARD

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

This document, SSP 57059, Standard Payload Integration Agreement for Pressurized Payloads, establishes the minimum requirements of the management structure and the execution of the roles and responsibilities for services and resources that will be used/provided by International Space Station (ISS) Program Participants for a pressurized payload. For the purpose of this document, the Research Program Office (RPO), Payload Developer (PD), and Appropriate Office are treated as equivalent entities.

The RPO, PD, or Appropriate Office and the ISS Program Office will use this book as the requirements document for the development, implementation, and compliance of the technical integration requirements and processes for a pressurized payload.

All commitments and services to be furnished by the ISS Program to the RPO, PD, or Appropriate Office under this Standard Payload Integration Agreement (SPIA) shall be furnished using its best efforts.

The method by which this will be accomplished is the Payload Integration Agreement (PIA), Appendix D to the SPIA. This co-signed PIA baselines the management agreements by both parties to the SPIA. It also baselines agreed-to deviations from the SPIA requirements. This SPIA is consistent with the processes and products to be prepared by the ISS Program Participants, as specified in SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan. This document is under the Configuration Management (CM) control of the ISS Program Payloads Control Board (PCB), and any changes or revisions will be reviewed and approved by the PCB.

/s/ Richard Nygren
Chair, Payloads Control Board
National Aeronautics and Space Administration

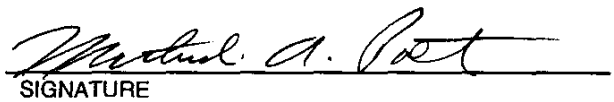
9/25/01
Date

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

CONCURRENCE

AUGUST 2001

Prepared by:	Mitchell Polt BOOK MANAGER	OZ2 ORG
	 SIGNATURE	9/7/01 DATE
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	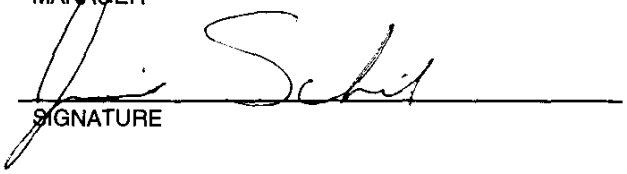 SIGNATURE	9-17-01 DATE
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	 SIGNATURE	9/24/01 DATE

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT FOR PRESSURIZED PAYLOADS

LIST OF CHANGES

AUGUST 2001

All changes to paragraphs, tables, and figures in this document are shown below:

PCB	Entry Date	Change	Paragraph(s)
	October 2001	Baseline	All

TABLE OF CONTENTS

APPENDIX

TABLE

1.0 INTRODUCTION

1.1 PURPOSE

The Standard Payload Integration Agreement (SPIA) documents the primary management and technical agreement requirements between the Research Program Office (RPO), Payload Developer (PD), or Appropriate Office and the International Space Station (ISS) Program. For the purpose of this document, the RPO, PD, and Appropriate Office are treated as equivalent entities.

This document applies to all ISS facility class and rack level pressurized payloads including complex operationally deployed payloads, but not covered by small payload, Window Observational Research Facility (WORF), or EXPRESS Requirements documents. The SPIA specifies all management and technical activities required for ground handling, transportation and on-orbit operation of a payload. The payload-unique Payload Integration Agreement (PIA) Increment Addendum similarly establishes the basis by which the operation of the payload will be implemented for specific on-orbit increments.

1.2 SCOPE

The payload-unique PIA is the top level document in a process that is divided into four separate parts: SPIA, PIA, the PIA Increment Addendum, and the Data Sets.

The SPIA is a requirements document, not an agreement. The PIA is an agreement, not a requirements document. Also, both documents treat the RPO and PD as an equivalent entity. Any agreed-to deviations from the SPIA requirements will be documented and jointly signed-to in the payload-unique PIA.

The SPIA defines management roles and responsibilities, flight and ground safety requirements, interface design requirements, verification and testing requirements, operational requirements, launch/landing site processing requirements, resource and interface commitments, and schedule tracking commitments.

The PIA Increment Addendum similarly establishes the payload operation support that will be implemented on an increment and flight-specific basis. The PIA Increment Addendum documents the tactical parameters, dynamic requirements, and commitments associated with specific transportation flights and on-orbit increment operations. Information in the Addendum will be provided for each increment the payload is on-orbit.

Data Sets define, on an increment and/or flight specific basis, the engineering, integration, and operational details of the requirements in the PIA Increment Addendum. Data Sets will be updated, as agreed to by the implementing organizations, to meet increment and/or flight-specific needs. For details of the payload integration processes, see SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program

Management Plan, through SSP 50200-10, Station Program Implementation Plan, Volume 10: Sustaining Engineering.

1.2.1 DOCUMENTATION

The primary documentation required to ensure proper integration of the payload consists of the SPIA, PIA, the PIA Increment Addendum, the Payload Data Sets, and a Payload Integration Schedule, applicable Interface Control Documents (ICDs), and verification plans. The PIA Increment Addendum is generated on an increment basis. Data Sets are generated on an increment or flight-specific basis, depending on the type of data.

1.2.2 APPROVAL AUTHORITY

The SPIA, PIA, PIA Increment Addendum, ICDs, and associated changes are to be approved jointly by the ISS Payloads Office and the RPO or Appropriate Office. The unique Data Sets are controlled by Level III Control Boards.

1.2.3 CONFIGURATION MANAGEMENT

Configuration control for this SPIA commences upon the last required signature of this document. The ISS Program will maintain configuration control of this document in accordance with SSP 41170, Configuration Management Requirements.

1.2.4 INTELLECTUAL PROPERTY AND GOODS

Each Participant to the PIA is obligated to transfer to the other any and all technical data and goods necessary to fulfill its responsibilities under this SPIA, subject to the following:

A. Nothing within this SPIA requires or obligates either Participant to transfer proprietary technical data and goods contrary to national laws, statutes, or regulations relating to export controls or to the control of classified data.

B. All payload data requested will be used exclusively for the purpose of assigning payload resources, accommodations and services as well as assessing compatibility for integration of the payload into the ISS. Proprietary data will be limited to the extent possible. Any unique handling of proprietary data will be negotiated with the ISS Program and documented in the PIA.

C. In the event there is a transfer of any technical data and goods that are protected for export control purposes, the furnishing Participant will adequately mark with a notice, or otherwise specifically identify, all affected technical data and goods. This notice or identification will indicate that affected technical data and goods will be used by the receiving Participant and its contractors and subcontractors only for the purposes of fulfilling the receiving Participant's responsibilities under this SPIA. The notice of identification will also provide that affected technical data will not be disclosed and such technical data and goods will not be further distributed to any

entity without prior written permission of the originating Participant. The Participants agree to abide by the terms of the notice or identification and to protect all affected technical data and goods. National Aeronautics and Space Administration (NASA), International Partners (IPs), and Participants will follow the technology transfer guidelines in the Intergovernmental Agreement (IGA). NASA will follow the export classification and marking process described in the NASA Export Control Program and in SSP 50223, International Space Station Export Control Plan.

D. The Participants are under no obligation to protect any unmarked proprietary technical data, documentation, or other unidentified protected goods.

E. Information relevant to integration, operations, and safety, as well as documentation development, including detailed design data, but excluding manufacturing, processing data, and associated software, will be exchanged without restriction as to use or disclosure. In the event of transfer of proprietary technical data for which protection is to be maintained, such technical data will be adequately marked with a notice indicating that this data will be used and disclosed by the receiving Participant and its contractors and subcontractors only for the purpose of fulfilling the receiving Participant's responsibilities under this SPIA. Proprietary data will not be disclosed or further distributed to any other entity without prior written permission of the originating Participant. The receiving Participant agrees to abide by the terms of the notice and to protect any such marked technical data from unauthorized use and disclosure.

1.3 PRECEDENCE

In the event of inconsistency among payload integration documentation contained within the applicable documents, resolution will be achieved by observing the following order of precedence:

A. Safety documents

B. Payload-unique PIA

C. SPIA

D. PIA Increment Addendum

E. Payload ICDs referenced within the SPIA/PIA Increment Addendum

F. Payload Data Sets

G. SPIA applicable documents other than A, B, C, D, E, and F

1.4 PUBLIC INFORMATION

Distribution of information to the public pertaining to the payload may be made by each Participant to this SPIA for its own portion of the Program on and increment and flight-specific basis in accordance with the ISS Program NASA Public Affairs Office. Insofar

as participation of the other Participant is involved, information may be released to the public after suitable consultation and agreement as to its content.

Certain categories of information regarding the payload, such as medical information collected from the crew and other proprietary information, is not suitable for public dissemination. The ISS communications system is considered sufficiently secure to protect the downlink of sensitive material. Onboard, password protection may be desired for some information. Distribution of sensitive material following receipt by the ground via mail, fax, or electronic means will be done using appropriate data privacy measures. The PD will supply encryption equipment (flight and ground) and requirements for secure communications channels and encryption techniques if the PD determines that this level of protection of proprietary payload data is justified.

1.5 FINANCIAL ARRANGEMENTS

The cost of discharging their respective responsibilities under this SPIA will be sustained by each Participant involved, unless otherwise mutually agreed upon. Technical agreements contained within this SPIA will be subject to the availability of appropriated funds. Should either Participant encounter financing problems, that Participant will notify the other Participant in a timely manner.

1.6 COMPLIANCE WITH EXPORT CONTROLS

Each U.S. Payload Developer is obligated to comply with Public Law, the ISS Export Control Policy, SSP 50223, the NASA Export Control Program, and local export management requirements. The Export Control status of each payload and payload product shall be identified by the sponsoring organization at the start of the payload integration processes with the ISS Program. All PDs must identify any and all hardware, software, or technical information that is subject to U.S. export controls. PDs shall be responsible for obtaining export classification per ISS Payloads Office issued direction (Letter OZ-01-00). Failure to obtain timely and complete export classifications for the payload may delay the payload integration process, and may result in the payload being de-manifested or manifested on later flights.

Non-U.S. PDs shall notify the ISS Payloads Office of any hardware, software, or technical information that is sensitive to export control restrictions for an International Partner or Participant.

2.0 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following documents is identified in the Program Automated Library System (PALS) (http://iss-www.jsc.nasa.gov/ss/issapt/pals) or Payload Integrated Library System (PILS) (http://sspweb.jsc.nasa.gov/pils/payload.cfm). The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

SSP 41170	Configuration Management Requirements
SSP 50004	Ground Support Equipment Design Requirements
SSP 50005	International Space Station Flight Crew Integration Standard (NASA–STD–3000/T)
SSP 50223	International Space Station Export Control Plan
SSP 50254	Operations Nomenclature
SSP 50323	Payload User Development Guide (PUDG) for the Space Station Training Facility (SSTF) Payload Training Capability (PTC)
SSP 50431	Space Station Program Requirements for Payloads *[applicable document only to NASA-funded payloads]*
SSP 50503	International Space Station Onboard Training Media Requirements
SSP 52000-IDD-ERP	EXpedite the PRocessing of Experiments to Space Station (EXPRESS) Rack Payloads Interface Definition Document
SSP 52000-PDS	Payload Data Sets Blank Book
SSP 52005	Payload Flight Equipment Requirements and Guidelines for Safety-Critical Structures
SSP 52054	ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic
SSP 57000	Pressurized Payloads Interface Requirements Document

SSP 57001	Pressurized Payloads Hardware Interface Control Document Template
SSP 57002	Payload Software Interface Control Document Template
SSP 57010	Pressurized Payloads Generic Payload Verification Plan
SSP 57025	ISS Payload Interface Systems Fault Tolerance Document
SSP 57057	ISS Payload Integration Template
SSP 58026-01	Generic Payload Simulator Requirements Document, Volume I
SSP 58200	Multilateral Payload Regulations
SSP 58304A	Ground Support Personnel Training and Certification Plan
SSP 58309	Payload Training Implementation Plan
SSP 58313A	NASA Payload Regulations
SSP 58700	U.S. Payload Operations Data File Management Plan
SSP 58700-ANX1	Annex 1 of the International Space Station U.S. Payload Operations Data File Management Plan
NSTS 1700.7B	Safety Policy and Requirements for Payloads Using the Space Transportation System
NSTS 1700.7B ISS Addendum	Safety Policy and Requirements for Payloads Using the International Space Station
NSTS 07700 Volume XIV	Space Shuttle System Payload Accommodation
NSTS 08242	Limitations for Non-Flight Materials and Equipment Used In and Around the Space Shuttle Orbiter Vehicles
NSTS/ISS 13830	Payload Safety Review and Data Submittal Requirements for Payloads Using the: -Space Shuttle -International Space Station
NSTS 14046	Payload Verification Requirements
NSTS/ISS 18798	Interpretations of NSTS/ISS Payload Safety Requirements

NSTS 21000-IDD-MDK	Middeck Interface Definition Document
JSC 20483	JSC Institutional Review Board Guidelines for Investigators Proposing Human Research for Space Flight and Related Investigations
JSC 28713	Space Station Mockup and Trainer Facility (SSMTF) Payload Interface Control Document (ICD) for the Payload Development, Flight Crew Support Laboratory, and Centrifuge Accommodation Module
JSC 36307	NASA Training Implementation Plan (TIP)
ISS-MPLM-IDD-006	Multi-Purpose Logistics Module (MPLM) Interface Definition Document (IDD)
KHB 1700.7B	Space Shuttle Payload Ground Safety Handbook
NASA-STD-5003	Fracture Control Requirements for Payloads Using the Space Shuttle
NIH 85-23	Guide for the Care and Use of Laboratory Animals
NPG 8910.1	NASA Procedures and Guidelines Care and Use of Animals

2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

SSP 30695	Acceptance Data Package Requirements Specification
SSP 41158	Software Interface Control Document Part I United States On-Orbit Segment to International Ground System Segment Ku-Band Telemetry Formats
SSP 50006	International Space Station Internal & External Decals & Placards Specification
SSP 50112	Operations Summary Document
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan

SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting
SSP 50200-03	Station Program Implementation Plan, Volume 3: Cargo Analytical Integration
SSP 50200-04	Station Program Implementation Plan, Volume 4: Payload Engineering Integration
SSP 50200-05 Part 1	Station Program Implementation Plan, Volume 5: Logistics and Maintenance, Part 1: Maintenance
SSP 50200-05 Part 2	Station Program Implementation Plan, Volume 5: Logistics and Maintenance Part 2: Logistics
SSP 50200-06	Station Program Implementation Plan, Volume 6: Cargo Physical Processing
SSP 50200-07	Station Program Implementation Plan, Volume 7: Training
SSP 50200-08	Station Program Implementation Plan, Volume 8: Increment Execution Preparation
SSP 50200-09	Station Program Implementation Plan, Volume 9: Real-Time Operations
SSP 50200-10	Station Program Implementation Plan, Volume 10: Sustaining Engineering
SSP 50260	International Space Station Medical Operations Requirements Documents (ISS MORD)
SSP 50304	POIC Capabilities Document
SSP 50305 Volume I	POIC to Generic User Interface Definition Document
SSP 50305-02	POIC to Generic User Interface Definition Document, Volume 2 Secured Services
SSP 50431	Space Station Program Requirements for Payloads *[reference document only to non-NASA-funded payloads]*

SSP 50467	ISS Cargo Stowage Technical Manual: Pressurized Volume
SSP 50486	Preflight Imagery Requirements for NASA-Provided ISS Government Furnished Equipment
SSP 50502	International Space Station Hardware Preflight Imagery Requirements
SSP 52000-PAH-KSC	International Space Station Payload Accommodations Handbook Payload Processing Accommodations at KSC
SSP 5410X-XX	Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests)
SSP 57011A	Payload Verification Program Plan
SSP 57020	Pressurized Payload Accommodation Handbook
SSP 58311	Payload Operations Integration Center Payload Operations Handbook, Volume 1: Pre/Post Increment Operations
SSP 58312	Payload Operations Integration Center Payload Operations Handbook Volume 2: Increment Operations
NSTS 21000-IDD-ISS	International Space Station Interface Definition Document
NSTS 21000-SIP-MDK	Shuttle/Payload Standard Integration Plan for Middeck-Type Payload
JSC 27472	Requirements for Submission of Data Needed for Toxicological Assessment of Chemicals and Biologicals to be Flown on Manned Spacecraft
JSC 28533	International Space Station (ISS) Catalog of IVA Government Furnished Equipment (GFE) Flight Crew Equipment
ARC-BRP-40086	User Operations Facility Capabilities Document
KHB 1710.2	Kennedy Space Center Safety Practices Handbook
LS 70053-2	JSC Telescience Support Center Capabilities Document
MIL-STD-100E	Engineering Drawings

SFOC-FL1860	International Space Station IVA Tool Catalog
TSC-DOC-006	GRC Telescience Support Center User Guide
TSC-HDBK-001	MSFC Telescience Support Center Capabilities Document

3.0 MANAGEMENT RESPONSIBILITIES AGREEMENT

3.1 RESPONSIBILITIES

The responsibility for ensuring the definition, control, implementation, and accomplishment of requirements and activities specified within this document is vested with the ISS Program and the Payload within the RPO or Appropriate Office. The ISS Program, as represented by the Payload Integration Manager (PIM), is responsible for the integration, operation and transportation to and from the ISS as documented in this SPIA. The RPO or Appropriate Office represented by the PD is responsible for the development, integration, and support of the payload. The ISS Program will and the PD shall staff pertinent integration activities, both analytical and physical, as identified within this SPIA, and according to the templates contained in SSP 57057, ISS Payload Integration Template.

If a PD is unable to solve a problem, the PIM should be contacted to discuss options.

3.1.1 ISS PROGRAM RESPONSIBILITIES

The ISS Program will perform the following activities:

A. Perform analytical, operations and physical integration of the integrated racks to Multi-Purpose Logistics Module (MPLM) and ISS for all payloads operating during the same increment as the payload.

B. Ensure the safety of the integrated element's payload complement at all times, requiring compliance with specific Safety documents (e.g., NSTS 1700.7B ISS Addendum, Safety Policy and Requirements for Payloads Using the International Space Station, etc.).

C. Ensure that all activities, facilities, services and resources required to support launch, landing and operation for a payload are provided, as specified within this SPIA.

D. Provide all necessary ISS requirements, ISS Program documents, and access to necessary ISS Program databases (e.g., Payload Data Library (PDL), Payload Information Management System (PIMS), interim User Requirements Collection (iURC)/User Requirements Collection (URC)) to the PD within a time frame that enables the PD to meet the commitments in this SPIA.

E. Assess the contents of all relevant payload-unique documentation and engineering data to determine whether payload requirements can be met by the ISS and the appropriate launch vehicle programs and negotiate alternative solutions for requirements that cannot be satisfied.

F. Supply to the PD all pertinent ISS Program-provided and launch vehicle program-provided flight hardware, verification equipment, facilities, and Ground Support Equipment (GSE), as noted in this SPIA.

G. Perform analytical and physical integration of stowed hardware as well as physical integration and testing as documented in this SPIA.

H. Provide test support for the appropriate interfaces during the installation of the payload into launch vehicle or carrier and in the ISS, as negotiated in this SPIA.

I. Assess and integrate the requirements for the Payload Operations Integration Center (POIC), Payload Data Services System (PDSS), and the appropriate IP equivalent Ground Data Services. These services will include all ground data services required for user training, simulations, and on-orbit operations.

J. Coordinate with PDs to develop integrated training products and perform training of the crew and the Ground Support Personnel (GSP).

K. Facilitate and manage the provision of ISS resources needed for the operation of the payload during transportation to and from orbit and while in the ISS to include any operational constraints.

L. Manage on-orbit payload stowage volume located inside the payload rack(s) and outside the payload rack(s) volume. Manage ISS allocated stowage volume for payloads during transport to and from ISS.

M. Perform physical deintegration of the payload from the transportation vehicle and/or carrier.

N. Return the payload, samples, and associated expendables from the ISS. After deintegration, ensure its availability to the PD, as specified in this SPIA.

O. Provide provisions to maintain/control proprietary information on a limited need-to-know basis (e.g., toxicology data).

3.1.2 PAYLOAD DEVELOPER RESPONSIBILITIES

The PD shall perform the following activities:

A. Deliver payload to the launch site as scheduled in Payload Integration Schedule.

B. Provide flight and ground safety certification statements to the ISS Program as per NSTS/ISS 13830, Payload Safety Review and Data Submittal Requirements for Payloads Using the: Space Shuttle, International Space Station.

C. Support implementation of the Certificate of Flight Readiness (CoFR) process consistent with SSP 52054, ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic.

D. Provide support to the ISS and appropriate transportation vehicle program analytical and physical integration activities identified within this SPIA.

E. Support, as appropriate, the structural, mechanical, materials, acoustics, Electromagnetic Compatibility (EMC)/Electromagnetic Interference (EMI), avionics, thermal, flight planning, flight operations, ground operations, and other technical areas essential to the review and resolution of integration and operational issues.

F. Respond to ISS Program requirements and provide documentation and data products according to negotiated payload-unique integration schedules.

G. Verify interface compatibility for the payload and PD-provided GSE.

H. Submit applicable documentation and data for PD-provided hardware, as specified in the Data Sets and the payload-unique verification requirements.

I. Provide appropriate personnel to adequately support all programmatic reviews as documented in this SPIA and in the Payloads Integrated Schedule.

J. Provide engineering drawings and photographs of payload-provided hardware. The documentation photography should show all areas of the payload where repair or service may be required and shall include photography of interface/tools. Because of potential lack of access due to payload configuration, some photographs will have to be performed at the vendor or contractor's facilities at convenient points during the payload's assembly and integration.

K. Provide, as deemed appropriate by the PD, a Preflight Imagery Matrix documenting the imagery planned to be collected during fabrication and assembly to support on-orbit maintenance, onboard training, historical documentation, operations, and procedure development. If provided, the Matrix should detail the images to be recorded. These images and associated data may be delivered to the Digital Imagery Management System (DIMS) for cataloguing, archiving and retrieval. Alternatively, the PD may decide to retain and manage the imagery within the PD organization, or embed the imagery in procedures developed to support onorbit maintenance and/or training.

   The objective of planning and collecting preflight imagery, regardless of the storage and management method selected by the PD, is to satisfy at least minimum ISS Program requirements for preflight imagery.

   Facility Class PDs must ensure collection of at least the minimum imagery needed to support maintenance of long-lived flight hardware onorbit. If the PD for subrack payloads elects to plan and collect no or insufficient preflight imagery to meet ISS Program requirements, the PD must accept the risk that requests for on orbit maintenance and/or training will be disapproved.

   If provided, the PD should develop the Preflight Imagery Matrix in accordance with SSP 50486, Preflight Imagery Requirements for NASA-Provided ISS Government Furnished Equipment (NASA payloads), and/or SSP 50502, International Space Station Hardware Preflight Imagery Requirements (multilateral payloads). These documents define the criteria for determining imagery quality and characteristics, and the metadata required to be provided with each image for incorporation into DIMS, if DIMS is the selected storage mechanism. The referenced documents define the comprehensive set of data items that may be associated with an image. However, the minimum set of data required per DIMS cataloguing includes: image titles; date taken; key words list; associated payload name; part name; part number; delivery flight; and image medium. If the PD employs the Preflight Imagery Matrix as

a project management tool, and elects to provide it to the ISS Payloads Office, it is recommended the Matrix be developed no later than the payload Critical Design Review.

L. Provide the appropriate training, training documentation, payload simulator, and other resources to support the training requirements.

M. The PD shall provide Reliability, Maintainability, and Quality Assurance (RM&QA), and problem reporting/tracking in accordance with SSP 50431, Space Station Program Requirements for Payloads.

   If the PD has not already identified or negotiated with the ISS Program a payload project plan deviating from SSP 50431 requirements, then any deviation will be addressed in the payload-unique PIA (e.g., existing processes for hardware and/or software problem reporting/resolution/tracking).

N. Provide engineering, integration, and operational requirements as specified in SSP 52000-PDS, Payload Data Sets Blank Book.

O. Archive payload analysis, test data, and inspection data required to substantiate closure of all payload verification requirements. This data must be available upon ISS Program request.

3.1.3 JOINT ISS PROGRAM/RESEARCH PROGRAM OFFICE OR APPROPRIATE OFFICE RESPONSIBILITIES

The ISS Program and the RPO or Appropriate Office shall perform the following activities as part of the agreed-to responsibilities:

A. Resolve, at the lowest possible management level, any disparity between specified requirements and the ability of the ISS Program or RPO or Appropriate Office to comply with them.

B. Yield authority to the commander of the Earth-To-Orbit Vehicle (ETOV) when action is required to ensure the safety and well-being of the crew and the transportation vehicle during all launch, pre- and post-docking with the ISS, and landing phases.

C. Yield authority to the commander of the ISS when action is required to ensure the safety and well-being of the crew, the ISS, and the attached transportation vehicle (if attached to the ISS) during all on-orbit ISS operations.

D. Notify immediately the other Participant of any noncompliance of requirements, which could affect safety, schedules, or mission success.

E. Support all required analytical, physical, and testing activities; operational and training activities; and safety reviews specified within this SPIA.

4.0 FLIGHT AND GROUND SAFETY REQUIREMENTS

4.1 GENERAL FLIGHT AND GROUND SAFETY REQUIREMENTS

The PD is responsible for ensuring that the payload with its complement of experiments, payload airborne support equipment, and payload GSE are safe. Flight and ground Phase III Safety Reviews must be completed 30 days prior to payload and GSE delivery to Kennedy Space Center (KSC). All PD-provided hardware and GSE (except that GSE covered by paragraph 4.1.2 of this Section) shall be designed and operated to comply with the requirements of NSTS 1700.7B, Safety Policy and Requirements for Payloads Using the Space Transportation System; NSTS 1700.7B ISS Addendum; and, KHB 1700.7B, Space Shuttle Payload Ground Safety Handbook. Safety reviews will be conducted in accordance with NSTS/ISS 13830. Safety requirements are supplemented by the interpretations and clarifications specified within NSTS/ISS 18798, Interpretations of NSTS/ISS Payload Safety Requirements. The payload shall meet these requirements at the SSP launch/landing sites and during flight operations, on-orbit operations, and ferry flights.

4.1.1 PAYLOAD DESIGN AND ON-ORBIT OPERATIONS REQUIREMENTS

The PD shall perform all interaction/interface safety analyses for the payload to ISS interfaces. In this safety hazard-level analysis, failures specified in SSP 57025, ISS Payload Interface Systems Fault Tolerance Document, and the flight operations will be assessed by the PD. The analysis will define assumptions made by the PD with respect to ISS services and operations associated with hazardous payload functions. The analysis will identify potential payload failures that could propagate to the ISS and exceed the design criteria specified in SSP 57000, Pressurized Payload Interface Requirements Document, and SSP 57001, Pressurized Payloads Hardware Interface Control Document Template.

4.1.2 GROUND SUPPORT EQUIPMENT DESIGN AND GROUND OPERATIONS REQUIREMENTS

The PD shall ensure that all of their newly designed and fabricated hardware or software categorized as GSE that is to be permanently turned over to the ISS Program (Form DD250 to NASA) complies with the requirements of SSP 50004, Ground Support Equipment Design Requirements.

4.2 INITIAL CONTACT BRIEFING

Prior to payload initiation into the Payload Safety Review Panel (PSRP), the Space Shuttle Program (SSP) may provide an initial contact safety briefing to the PD. This request should be coordinated between the PSRP Executive Secretary and the ISS PIM.

4.3 HAZARDOUS MATERIALS SUMMARY

The PD shall provide full disclosure of the contents (including flammability, Measure of acidity (pH), toxicity) of all substances including proprietary material used in or produced by the payload. The PD shall submit a materials list of all samples to the NASA/JSC Toxicology Group in accordance with NSTS/ISS 13830 and JSC 27472, Requirements for Submission of Data Needed for Toxicological Assessment of Chemicals and Biologicals to be Flown on Manned Spacecraft, for approval. The PD will verify that (1) materials planned to be loaded are listed on the approved Payload Test Material/Chemical Data Verification (V)-1 Hazardous Materials Summary Table (HMST), and (2) the PD's as-loaded materials list complies with the As-Loaded Test-Material/Chemical Verification Form (V-2) HMST. After final HMST approval, only deletions and/or reductions in concentration of the hazardous materials are allowed. The payload must also comply with the toxic labeling standards in NSTS 07700, Volume XIV, Space Shuttle System Payload Accommodation, Appendix 9.

4.4 BIOMEDICAL INVESTIGATIONS

JSC 20483, JSC Institutional Review Board Guidelines for Investigators Proposing Human Research for Space Flight and Related Investigations, establishes policies to be implemented by NASA - Johnson Space Center (JSC) Institutional Review Board (IRB) regarding human research protocol. The Partner's IRB and Human Research Multilateral Review Board (HRMRB), will review and approve any protocols in which the payload uses preflight, in-flight, on-orbit, or post-flight scientific or medical protocol on human subjects on ISS. The following paragraphs C and D will address the care and use of laboratory animals in space flight investigations on ISS.

A. The PD shall prepare and support an integrated hazard assessment of the entire payload and its interfaces for each flight increment and/or resupply mission. The flight surgeon in the Mission Control Center - Houston (MCC-H) Flight Control Room (FCR) is the real-time authority regarding flight crew health in-flight. The ISS Program, represented by the MCC-H FCR surgeon, will perform real-time monitoring of biomedical items requiring physician monitoring on the ground with respect to flight crew health and safety. The requirement for crewmember consent and the restrictions on the use of crewmembers as subjects are described in SSP 50260, International Space Station Medical Operations Requirements Document (ISS MORD).

B. The PD, with approval from the HRMRB, shall determine the data monitoring requirements for particular biomedical experiments being performed. For some biomedical experiments (intense exercise, lower body negative pressure, etc.), downlinked electrocardiogram data will be required by the FCR Surgeon.

C. The PD shall comply with NIH 85-23, Guide for the Care and Use of Laboratory Animals, and NPG 8910.1, NASA Procedures and Guidelines Care and Use of Animals, when a payload uses vertebrates.

D. PDs utilizing vertebrates and installed in United States (U.S.) elements or utilizing U.S. controlled hardware shall submit their flight protocols to the Ames Research Center (ARC) Institutional Animal Care and Use Committee (IACUC) for approval. Upon review and approval, these protocols will be forwarded to the KSC IACUC for approval in the event that said vertebrates are housed in KSC facilities preflight and post-flight. Any utilization of vertebrates for crew training at JSC with the associated vertebrate elements will require forwarding to the JSC IACUC following ARC approval for ground activities.

5.0 INTERFACE DESIGN REQUIREMENTS, VERIFICATION, AND TESTING

A. The PD shall design and build flight hardware and software in accordance with SSP 57000 and with the unique payload hardware and software ICDs.

B. The PD shall develop the unique payload verification plan in accordance with SSP 57010, Pressurized Payloads Generic Payload Verification Plan. Additionally, the PD is required to submit the Payload-Unique Acoustic Control Plan, Payload-Unique Microgravity Control Plan, and Payload-Unique EMI/EMC Control Plan, according to the guidelines outlined in the appendices of the Generic Payload Verification Plan (GPVP) to the ISS Program for review.

   The unique payload verification plan must contain a description of all test and checkout hardware/software used for payload verification, including any GSE used to simulate flight hardware for test purposes.

   The PD shall develop and provide to the SSP the Structural Verification Plan (SVP) and Fracture Control Plan in accordance with SSP 52005, Payload Flight Equipment Requirements and Guidelines for Safety Critical-Structures; NSTS 14046, Payload Verification Requirements; and NASA-STD-5003, Fracture Control Requirements for Payloads Using the Space Shuttle.

C. The ISS Program and the PD shall approve the unique payload verification plan. The SSP Structures Working Group (SWG) shall approve the SVP and Fracture Control Plan in accordance to the requirements of NSTS 14046 and NASA-STD-5003 for launch and landing requirements. The ISS Program and SSP will perform additional analysis of the payload to ensure that the Orbiter Middeck (MDK), MPLM and ISS on-orbit payload complements are safe, compatible, and operable with the ISS and SSP systems and interfaces.

D. The PD shall certify to the ISS Program that all payload verification has been completed and the required data and models are complete and accurate and have been submitted to the ISS Program as documented in the unique payload verification plan.

   The PD shall certify to the SSP that all payload verification has been completed and the required data and models are completed and accurate and have been submitted to the SSP as documented in the SVP and the Fracture Control Plan, as required by NSTS 14046 and NASA-STD-5003.

E. The PD shall provide Manifest/Stowage Requirements Data to both ISS Manifest and ISS Cargo Integration via the PDL in accordance with the manifest/stowage requirements in SSP 52000-PDS, Section 9.3.3. The data collected for the manifest will support the production of SSP 5410X-XX, Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests), for each flight. ISS Cargo Integration requires data in order to design and plan for analytical and physical stowage accommodation aboard the launch vehicle and ISS. This data includes

mass, dimensions, stowage engineering drawings, hazard code, item groupings, location needs, unique packing or stowage requirements, etc., to support the manifest/stowage integration process.

5.1 PAYLOAD INTERFACE REQUIREMENTS AND CONTROL

Payload to ISS interface requirements are documented in SSP 57000, Section 3.

A. The PD shall ensure that payload flight hardware and software are designed and built in accordance with the applicable subsections of SSP 57000, Section 3. Applicable requirements are determined according to the interfaces utilized by the payload flight hardware and software and are documented in the unique payload hardware and software ICD.

B. Design characteristics of the interfaces utilized by the payload flight hardware/software and unique ISS implementation characteristics for the particular payload locations are documented and controlled in the payload-unique ICD. The ISS Program will develop unique payload ICDs in accordance with SSP 57001 and SSP 57002, Payload Software Interface Control Document Template, utilizing PD-provided interface implementation data.

C. The ISS Program and PD shall approve the payload-unique ICD.

5.1.1 MULTI-PURPOSE LOGISTICS MODULE TRANSPORTED PAYLOADS

Basic design loads and requirements for MPLM transported payloads are documented in SSP 57000.

A. The PD shall deliver the structural models to the ISS Program as specified in SSP 57000, Section 4.3.1.1; SSP 52005; and ISS-MPLM-IDD-006, Multi-Purpose Logistics Module (MPLM) Interface Definition Document (IDD).

B. The PD shall provide data in accordance with the negotiated Payload-Unique Integration Schedule.

5.1.2 EXPRESS/EXPRESS TRANSPORTATION RACK TRANSPORTED PAYLOADS

Basic design loads and requirements for payloads transported on an EXpedite the PRocessing of Experiments to the Space Station (EXPRESS) Rack or EXPRESS Transportation Rack are documented in SSP 52000-IDD-ERP, EXpedite the PRocessing of Experiments to Space Station (EXPRESS) Rack Payloads Interface Definition Document.

A. The PD shall deliver the structural models to the ISS Program as specified in SSP 52000-IDD-ERP and SSP 52005.

B. The PD shall provide data in accordance with the negotiated Payload-Unique Integration Schedule.

5.1.3 ORBITER MIDDECK TRANSPORTED PAYLOADS

Basic design loads and requirements for Orbiter MDK transported payloads are documented in NSTS 21000-IDD-MDK, Middeck Interface Definition Document.

A. The PD shall ensure delivery of structural data to the ISS Program as specified in NSTS 21000-IDD-MDK and SSP 52005.

B. For powered Orbiter MDK transported payloads, the PD shall provide electrical and thermal, EMC/EMI, and acoustic data to the ISS Program as specified in NSTS 21000-IDD-MDK.

C. The PD shall provide data in accordance with the negotiated Payload-Unique Integration Schedule.

5.2 VERIFICATION AND TESTING

A. The PD shall submit the verification data according to the Payload-Unique Verification Plan based on the guidelines outlined in SSP 57010 for review and approval by the ISS Program. All plans will be submitted to the ISS Program in accordance with the Payload-Unique Integration Schedule.

   The PD shall submit the SVP and Fracture Control Plan for review and approval by the SSP. The SVP and Fracture Control Plan shall be submitted directly to the SWG as required in NSTS 14046. The SVP and Fracture Control Plan shall contain the verification requirements of NSTS 14046.

B. The PD shall verify the facility payload/subrack hardware and software functional performance, ISS interface, and safety controls in accordance with the PD's unique verification plan. The PD shall provide engineering and/or test data to the ISS and Shuttle Programs as specified in the unique payload verification plan.

C. The PD shall verify compatibility with the interfaces and environments specified in the Interface Requirements Document (IRD) as agreed to in the payload-unique ICD. When applicable, verification of physical and functional interface compatibility with the ISS will be aided by the use of a Program-provided Payload Rack Checkout Unit (PRCU) or equivalent. The PRCU units will be provided at PD sites as negotiated and documented in Section 4.2 of the payload-unique PIA Increment Addendum.

   The primary purpose of the Payload Test and Checkout System (PTCS) located at KSC is to perform the final on-line functional interface testing to ensure compatibility between the Payload (e.g., facility class, EXPRESS, attached payload, etc.) and the ISS system. Active payloads installed and integrated into the MPLM for transportation to the ISS may be required to participate in a Cargo Integration Test Equipment (CITE) test. CITE testing will be performed per the policies and philosophies documented in NSTS 14046. CITE testing requirements will not affect passive payloads in the MPLM as they do not have a direct interface with the Orbiter.

D. For payloads with direct interfaces with the Orbiter, the PD shall verify compatibility with the Orbiter interfaces and environments as specified in the applicable SSP Mission Integration Plan (MIP) and ICD.

E. The MDK payload-to-Orbiter interface verification requirements shall be identified by the PD and developed with KSC support in SSP 52000-PDS, Section 8, KSC Technical Requirements Data Set.

F. The PD shall identify and document in SSP 52000-PDS, Section 8, KSC Technical Requirements Data Set, any MDK payload-to-Orbiter interfaces which cannot or will not be verified prior to flight.

G. The PD shall also document the supporting rationale for not testing the interface in, SSP 52000-PDS, Section 8, KSC Technical Requirements Data Set.

H. The RPO, with PD support, shall provide certification of readiness statements to the ISS Program consistent with the requirements and process defined in SSP 52054.

6.0 OPERATIONAL REQUIREMENTS

Requirements for payload planning, training, operating procedures and references, ground data services, on-orbit payload verification and checkout, and baseline data collection are contained in this section. These requirements, along with other operational topics, will be discussed with the POIC at Payload Operations Integration Working Groups (POIWGs).

A. It is recommended that PDs attend POIWG meetings, starting at Increment minus (I-)24 months or sooner is desired.

B. Real-time, the PD shall operate the payload in accordance with the POIC policies and procedures established by SSP 58200, Multilateral Payload Regulations, and SSP 58313A, NASA Payload Regulations.

6.1 PAYLOAD PLANNING DATA SET

The PD shall provide payload planning and resource requirements specifications to the POIC planners as specified in SSP 52000-PDS, Section 10, Payload Planning Data Set, via the iURC/URC tool. These include onboard resources such as crew time, power, thermal, command, and file uplink and data downlink requirements. Using the payload, systems, and program requirements and constraints, the ISS Program, represented by the POIC mission planners, will develop integrated payload plans which will be integrated with the ISS systems plan. The POIC mission planners will provide the PD the integrated planning products, including the Payload On-Orbit Operations Summary (PL OOS), via the Increment Operations Plan (IOP).

6.2 TRAINING

6.2.1 TRAINING REQUIREMENTS

A. The PD shall develop a Trainer Specification document that defines how each PD provided trainer/simulator will meet the requirements specified in SSP 58026-01, Generic Payload Simulator Requirements Document, Volume I. The PD shall define the process and requirements for integrating subrack payload simulator/trainers into the facility payload trainer. This document shall be included in the PD's Preliminary Design Review (PDR) and Critical Design Review (CDR) data packages. PD-provided simulators to the Space Station Training Facility (SSTF)/Payload Training Capability (PTC) must adhere to SSP 50323, Payload User Development Guide (PUDG) for the Space Station Training Facility (SSTF) Payload Training Capability (PTC). PD-provided simulators to the Space Station Mockup and Trainer Facility (SSMTF) must adhere to JSC 28713, Space Station Mockup and Trainer Facility (SSMTF) Payload Interface Control Document (ICD) for the Payload Development, Flight Crew Support Laboratory, and Centrifuge Accommodation Module.

B. A Simulator Interface Definition Document (IDD) will also be required of each facility class payload who will accommodate subrack payload simulators/trainers. The IDD

would define the interfaces required for a subrack payload developer to design a simulator/trainer that would be used within the facilities simulator/trainer.

6.2.2 PAYLOAD TRAINING DATA SET

The data requested in this document will be required for facilities, subrack payloads and experiments.

A. The PD shall provide payload training and resource requirements to the Training Strategy Team (TST) process as required by SSP 58309, Payload Training Implementation Plan; JSC 36307, NASA Training Implementation Plan (TIP); and SSP 50503, International Space Station Onboard Training Media Requirements.

B. The PD shall participate in the TST process for the purpose of defining flight crew onboard and Increment-based training, ground operations cadre/support training, and trainer/simulator requirements. Requirements discussed and agreed to during the TST process will be input into the PDL as defined in SSP 52000-PDS, Section 4.

C. To support payload training, the PD shall develop and deliver to JSC a payload simulator which will support crew training on nominal, maintenance, safety-related, and limited malfunction operations. SSP 58026-01 will be developed by POIC for each of these payloads. SSP 58026-01 will be a generic document with an appendix that is applicable to the specific type of payload being developed.

   If required, a payload-specific Volume II to SSP 58026-01 will be developed by POIC and will include payload-specific checkout information, displays definitions and information required for integration of the simulator in the applicable NASA JSC training facility. This Volume II will have its own unique number for each payload for which it is developed. The PD shall support the development of this document by supplying supporting data to the Payload Training Data Set.

D. Training simulators for all but simple or single-increment payloads will provide high fidelity crew interfaces and will be integrated into the SSTF/PTC. These simulators will also be used to support simulations integrating the crew and GSP. Simple or single-increment payloads will require a standalone trainer or Computer-Based Trainer (CBT). Special training equipment (e.g., CBT, light-weight mockups, videos, etc.) may also be required to support specific payload training objectives. In addition, the PD shall provide the PD's requirements for the use of supporting services such as telecommunication and data links in the Training Data Set.

E. The PD shall support the development of training plans, procedures, courseware, or other materials for all training related to their payload. This also includes the development of flight products such as crew procedures and displays in time to support training verification activities.

F. Training records will be collected for all training sessions. When the training takes place at the PD's site, the PD is responsible for tracking and recording training hours. When training takes place in the SSTF/PTC, the Crew Training Coordinator

(CTC) shall be responsible for tracking and recording training hours. All training records shall be provided to the Payload Training Integrator (PTI).

G. The PD shall provide detailed crew training requirements and shall identify ground support requirements in the Payload Training Data Set. This will include training curricula for the crews who will operate the payload on-orbit.

H. The PD shall provide detailed trainer/simulator requirements in the Payload Training Data Set. The Training Data Set contents will also document training assessment results of the TST process. For more detailed information on determining the training and simulator requirements, see SSP 58309.

I. The PD shall provide team member names and functions in the Payload Training Data Set. The PD shall define the PD team members training curriculum requirements in the Training Data Set. The PD shall participate in required training to become certified for flight operations. SSP 58304A, Ground Support Personnel Training and Certification Plan, Sections 6.0 through 6.4, are applicable to this section. GSP requirements to be updated to match SSP 52000-PDS input. GSP requirements will be documented in SSP 52000-PDS.

J. The PD shall define Telescience Support Center (TSC) specific training requirements in the Payload Training Data Set.

K. The PD shall provide on-board training materials when required by the TST process. These materials will be developed in accordance with SSP 50503 and verified per SSP 58309.

6.3 PAYLOAD OPERATIONS DATA SET

The following paragraphs provide an overview of information required to be input into the Payload Operations Data Set.

The Payload Operations Data Set provides the detailed flight operations requirements for the PD and ISS personnel. The PD shall provide the details of these flight operations requirements in SSP 52000-PDS.

The Payload Operations Data Set addresses the flight operations interfaces between the ISS Program Payload Operations Integration (POI) personnel and the PD operations team. Payload flight operations information includes communication and coordination requirements, detailed video/photo requirements, Launch Commit Criteria, and Payload Flight Rules and Regulations.

A. The PD shall submit any known operational constraints or activities that may adversely impact the science or hardware of other payloads or themselves. These impacts will be integrated and documented in SSP 58002 and SSP 58313.

B. The PD shall submit any known payload activities that may adversely impact Shuttle or ISS systems, or crew health or safety to be integrated and documented in the appropriate Flight Rules document.

6.4 PAYLOAD PROCEDURES AND DISPLAYS DATA SET

The following paragraphs provide an overview of information required to be input into the Payload Procedures and Displays Data Set.

The PD shall provide manual payload operating procedures, ground command procedures, payload messages, automated procedures, payload data files and reference materials (e.g., Earth observation maps, operations nomenclature for loose items, validation record, validation plan, engineering drawings, schematics, and hardware diagrams) for the payload. These inputs will include activation and checkout, nominal (including installation), malfunction, corrective, quick response procedures, and log files for both ETOV and on-orbit operations. The PD shall provide procedure input via Online Project Management System (OPMS)/PIMS and shall conform to the requirements of SSP 58700, U.S. Payload Operations Data File Management Plan.

The PD shall also provide payload inputs (as appropriate) to the flight systems, including Multiplexer/Demultiplexer (MDM) files and Payload Executive Processor (PEP) Tables. The PEP Tables provide command and telemetry for the Payload MDM.

The PD shall provide payload displays and operational reference information (e.g., non-dynamic displays, dynamic displays, hardware diagrams, engineering drawings and operations nomenclature) for operability and human computer interface assessments of the payload procedures and displays. The PD shall provide display input via OPMS/PIMS.

All PDs developing displays shall conform to the requirements of SSP 50005, International Space Station Flight Crew Integration Standard (NASA-STD-3000/T), paragraph 9.4.2.3.2 and SSP 58700. The PD shall submit the payload displays to the ISS Program Payload Display Review Panel (PDRP) for approval.

The PD shall provide their payload specific Operations Nomenclature in SSP 50254, Operations Nomenclature.

The PD developing automated procedures shall conform to the requirements of SSP 58700-ANX1, Annex 1 of the International Space Station U.S. Payload Operations Data File Management Plan. Automated procedures shall be provided in PIMS.

6.5 GROUND DATA SERVICES DATA SET

The PD shall provide the ground data services detailed requirements through the Payload Ground Data Services Data Set. These services include payload-unique services required in the United States Operations Center (USOC), a TSC, or at a remote site, including network and/or hardware connectivity requirements. The Ground Data Services Data Set also addresses the PD identification of voice loop requirements, data requirements, and POIC service requirements.

The respective user manuals will define all standard services available to PDs for the following locations:

A. ARC TSC, ARC-BRP-40086, User Operations Facility Capabilities Document

B. Glenn Research Center (GRC) TSC, TSC-DOC-006, GRC Telescience Support Center User Guide

C. JSC TSC, LS 70053-2, JSC Telescience Support Center Capabilities Document

D. Marshall Space Flight Center (MSFC) TSC, TSC-HDBK-001, MSFC Telescience Support Center Capabilities Document

E. USOC, SSP 50304, POIC Capabilities Document

Requests for non-standard services must be assessed for cost and schedule impacts prior to approval. Any costs for non-standard services shall be the exclusive responsibility of the PD.

6.6 BASELINE DATA COLLECTION

The ISS Program will provide baseline data collection facilities at the primary launch and contingency landing sites for ISS crews (KSC, Dryden Flight Research Center (DFRC), and Russia **<TBR 6-2>**). Facility requirements are captured in SSP 52000-PDS, Section 7, KSC Support Requirements. Preflight and post-flight crew time requirements are captured in SSP 52000-PDS, Section 4, Payload Training Requirements. If crew biomedical data is not needed as part of the research objectives, this section is Not Applicable (N/A).

7.0 LAUNCH/LANDING SITE PROCESSING

KSC Launch Site Processing includes off-line support, both physical integration and deintegration, and the checkout of payload interfaces to high-fidelity ISS and Orbiter simulated interfaces and actual Orbiter interfaces. Payload processing activities extend from prelaunch to post-landing phases, including supporting late access to the MPLM and to the Orbiter MDK and payload bay, as well as early access to the MPLM and to the Orbiter MDK. Detailed information regarding KSC launch site processing is contained in SSP 52000-PAH-KSC, International Space Station Payload Accommodation Handbook Payload Processing Accommodations at KSC.

Any payload requirements levied on KSC that are SSP Services or ISS Program-funded SSP Services are to be negotiated and documented in section 3.5 of the unique PIA Increment Addendum. All ISS Program launch support services available are considered Standard Services and are identified in the PDS Support Requirements Data Set and Technical Requirements Data Set. The corresponding details of these unique PIA Increment Addendum requirements and ISS Standard Services are negotiated and documented in the KSC Technical Requirements and KSC Support Requirements Data Sets, as documented in SSP 52000-PDS.

7.1 PAYLOAD PROCESSING

A. The PD shall support KSC in the development of the KSC Payloads Deliverable Schedule.

   Following offline processing, all online processing and payload installation activities are scheduled, performed, and controlled by KSC Launch and Landing (L&L) personnel.

B. The PD shall provide support for the payload processing as necessary. Crew Equipment Interface Test (CEIT) requirements will be determined by the Crew Office. Fit checks with different payload hardware, Orbiters, MDK locations and/or specific ISS interfaces will be determined by the ISS Program, SSP, KSC, and PD on a flight-by-flight basis. CEIT shall be coordinated with the Vehicle Integration Test Office (VITO).

C. The PD shall be responsible for providing/funding a second set of payload-unique ground equipment whenever an overlapping requirement for the use of this equipment is identified for concurrent payload integration activities.

D. During the launch site processing of the payload, the SSP will conduct an inspection of the payload for sharp edges/corners/surfaces or protrusions that may injure a crewmember or damage associated equipment. This inspection will be coordinated with the ISS Program, and corrective actions will be taken by the ISS Program or the ISS Program's representatives. Hazards not correctable will be identified and documented. Because of potential lack of access due to payload configuration, some inspections and photographs will have to be performed at the vendor or

contractor's facilities at convenient points during the payload's assembly and integration before shipment of the payload to KSC.

In addition, a complete set of payload photographs is required to be taken by the ISS Program during individual Cargo Element assembly and buildup. The SSP will take required photographs of the payload before and after installation in the Orbiter including close-out photographs. These photographs are necessary to support ground operations, flight crew and flight controller training, Flight Data File (FDF) development, and possible in-flight contingencies. This documentation photography should show all areas of the payload where repair or service may be required and shall include photography of interface/tools. These photographic activities will be scheduled and coordinated with the ISS Program.

E. The PD shall ensure that the payload hardware complies with material and equipment requirements defined in KHB 1700.7B and NSTS 08242, Limitations for Non-Flight Materials and Equipment Used In and Around the Space Shuttle Orbiter Vehicles, during KSC ground operations.

7.1.1 ORBITER MIDDECK PAYLOADS

A. Payload hardware transported to orbit in the Orbiter MDK will be nominally installed at the launch pad prior to the start of the mission launch countdown. The payloads will be installed and any interface verification tests, close-out procedures, and payload-unique tests will be accomplished by the SSP.

Fit checks may be required in the Orbiter for MDK payloads that are replacements for MDK lockers. This nominally occurs when the Orbiter is in the Orbiter Processing Facility (OPF) prior to or during the flight CEIT. Payloads that have an envelope exceedance to the NSTS 21000-IDD-MDK dimensions (Y or Z axis) or those that have new Orbiter interfaces (such as payload-unique power cables or mounting panels) will be fit checked in the Orbiter crew compartment. Double-size middeck payloads will also be fit checked inside the Orbiter in middeck locations where a double-size locker payload has not previously flown. Fit checks can be performed off-line (outside the Orbiter) for those payloads that only need to be fit checked to SSP-provided payload mounting panels and SSP-provided power cables. The requirement for a fit check will be determined by SSP, KSC, and payload representatives.

Payload services, such as MDK prelaunch power, dedicated cooling, and data monitoring, are SSP Services.

B. The following is applicable if the payload has MDK late access (turnover/servicing) requirements.

Payload requirements for the late turnover/installation of payload hardware and/or late payload servicing are SSP Services. These requirements will be defined in Section 3.5 of the unique PIA Increment Addendum.

SSP Services associated with MDK late access must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum. In addition, Section 3.5 of the unique PIA Increment Addendum to this document will be used to document the PD's justification of their requirements for payload late turnover within Launch minus (L-)28 hours in terms of potential research/science loss. Payload turnovers to KSC must be completed by L-19.5 hours. Payload turnover times are based on completion of payload installation at L-17.5 hours. Late turnover requirements will not delay the vehicle launch countdown from proceeding to the primary mission planned launch window. Late turnover requirements may affect manifesting. Late turnover requirements will require coordination with the Launch Team/Launch Director during the launch countdown planning process. Late turnover conflicts may result in adjustments to turnover times. Mission-unique MDK processing schedules will be developed by KSC based upon documented MDK turnover requirements. Actual MDK turnover times will be scheduled based on these requirements. If payload hardware requiring MDK late turnover cannot be installed within its allocated time, the SSP may decide not to install the payload or to fly the payload in a non-operational mode. For more information on MDK Orbiter Integration, reference NSTS 21000-SIP-MDK, Shuttle/Payload Standard Integration Plan for Middeck-Type Payload.

7.1.2 MULTI-PURPOSE LOGISTICS MODULE PAYLOADS

ISS Program payloads transported to orbit in the MPLM carrier will be installed in the MPLM after payload verification and checkout are completed. At approximately L-2.5 months, there is an opportunity for time-critical payload installation, stowage, servicing, and closeouts in the Space Station Processing Facility (SSPF). The MPLM is then transported to the pad for installation into the Orbiter.

After MPLM installation into the Orbiter, access to payloads mounted inside the MPLM will be available only for late installation of conditioned samples into the refrigerators and freezers as an SSP Service. Late access for stowage of refrigerator and freezer samples inside the MPLM is completed by L-88 hours and is followed by MPLM late access GSE removal.

SSP Services associated with the late installation of payload conditioned samples must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum to this document.

7.2 LAUNCH READINESS

The following represents the PD's launch readiness requirements. The PD shall ensure:

A. The payload is capable of sustaining the launch configuration without physical access until such time as noted in the unique PIA Increment Addendum, Table 4.4.1-1, Payload Maximum Launch Configuration Duration. Exceptions to this (such

as launch delays, identified in Section 7.3) must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum.

B. The payload is capable of sustaining the transportation configuration until it is installed in the ISS.

7.2.1 ORBITER MIDDECK PAYLOADS

Payloads that are installed in the Orbiter MDK must be in the launch configuration once prelaunch installation and verification activities are completed.

7.2.2 MULTI-PURPOSE LOGISTICS MODULE PAYLOADS

The MPLM payload will be in launch configuration prior to the final Orbiter payload bay door closure. For payloads in MPLM that require power-on after MPLM closeout and payload bay door closure, the PD shall ensure that safety requirements for command and monitoring are met during the prelaunch, ascent, and early on-orbit mission phases.

7.3 LAUNCH DELAY/SCRUB TURNAROUND PROCESSING

Delays in the Shuttle launches occur due to numerous unforeseen and uncontrollable events. Services provided to the payload due to launch delays are considered SSP Services.

All MPLM Payloads should support launch attempts for a minimum of 96 hours from the initial planned Time to launch minus (T-)0 without requiring MPLM access. Any MPLM access requirements of less than 96 hours must be negotiated with the SSP. In the event that a Shuttle scrub causes a loss of MPLM power for greater than 8 hours, then MPLM access will be provided. There are no anticipated scrub scenarios which would result in the loss of MPLM power for greater than 8 hours.

A. Due to the criticality of operations required to reestablish the proper launch configuration after a delay, the PD shall support delay scenarios as appropriate.

   For samples/hardware requiring access as a result of a delay, the ISS Program and the SSP will determine if servicing/changeout is possible under the actual conditions. If a replacement is agreed to, the PD must plan for providing the necessary replacement items, personnel, and equipment.

   For short launch delays, such as 24 hours, the time available for experiment refurbishment may necessitate replacement of samples at the pad in lieu of returning the hardware to the PD. For middeck experiments that are only viable for the first planned launch attempt, the PD must have redundant hardware and/or biospecimens in order to facilitate an exchange at the pad.

B. The PD shall specify all payload requirements for applicable launch delays.

SSP Services associated with contingencies such as Orbiter launch delays/scrub turnaround must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum.

7.4 POST-LANDING

7.4.1 NOMINAL POST-LANDING PROCESSING

If the End of Mission (EOM) landing is at KSC Shuttle Landing Facility (SLF), time-critical MDK payload items (e.g., live specimens) are removed at the landing strip (SSP Service) prior to Orbiter tow. The Orbiter is then towed to the OPF, jacked, and leveled; the remaining MDK payload items are removed(within 4 days of landing); and final safing/deservicing operations are completed. Conditioned samples are removed from the refrigerator/freezers in the MPLM approximately five days after landing. MPLM removal from the Orbiter is normally completed seven days after the Orbiter arrives at the OPF. The MPLM is then returned to the ISS Program for further payload deintegration.

If the EOM landing is at DFRC, time-critical MDK payload items (e.g., live specimens) are removed at the landing strip (SSP Service), prior to Orbiter tow. The Orbiter is then towed to the Mate/Demate Device (MDD), and following jacking and leveling, the remaining MDK payload items are removed(within 4 days of landing), and final safing/deservicing operations are completed. At DFRC, access to conditioned samples in the MPLM will be at approximately Return plus (R+)4 days. After all MDK and MPLM samples have been removed, the Orbiter (with the MPLM aboard) is mated to the Shuttle Carrier Aircraft (SCA) for return to KSC. After arrival at KSC, the Orbiter is demated from the SCA and towed to the OPF for payload removal and final de-servicing operations. MPLM removal from the Orbiter is normally completed seven days after the Orbiter arrives at the OPF. The MPLM is then returned to the ISS Program for further payload deintegration.

SSP Services associated with post-landing processing must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum. Early access to the MPLM at KSC and DFRC for removal of conditioned samples is an SSP Service.

7.4.2 INTACT ABORT PROCESSING

Should an aborted flight land at KSC or at DFRC, the SSP will remove the MDK payloads using its best efforts. If an aborted flight lands at a site other than KSC or DFRC, the payloads stowed in the Orbiter MDK will be removed and returned by the SSP separately to the launch site for turnover to the PD.

If an aborted flight lands at a site other than KSC, all returned payload complement hardware in the MPLM will nominally remain onboard the Orbiter for ferry to the launch site via the SCA. However, because of non-primary landing site locations, weight,

center of gravity (c.g.), safety considerations, or mission-unique requirements, portions or all of the MPLM may be removed from the Orbiter payload bay, deintegrated (if required), and transported in ISS Program-provided shipping containers by the ISS Program to the launch site.

The ISS Program and the PD are responsible for the performance of payload-unique operations (data removal, safing, preparations for transporting, etc.) and will provide the landing site personnel and GSE to conduct these operations. Within the transportation provisions for the SSP GSE and personnel, the SSP will provide, on a space-available basis, transportation of payload-unique GSE and personnel to and from the landing site.

7.4.3 EARLY END OF MISSION SUPPORT

An Early End of Mission (EEOM) occurs if a flight lands at KSC or DFRC before the planned EOM. In this case, the SSP shall remove and disposition the payload using its best efforts. If the payload requires EEOM support other than best effort, this support is an ISS Program-funded SSP Service.

ISS Program-funded SSP Services associated with an EEOM support must be negotiated and documented in Section 3.5 of the unique PIA Increment Addendum.

7.5 FERRY FLIGHT OPERATIONS

SSP 57000 should be referenced for MPLM ferry flight environment. Payloads inside the MPLM shall not impose unique Orbiter ferry flight requirements.

For payload planning purposes, nominal EOM ferry flight occurs approximately seven days after landing, with KSC arrival approximately nine days after landing.

8.0 SCHEDULES FOR DELIVERABLES

An ISS Program PIM Schedule template is defined to ensure payload integration work is defined and scheduled to meet the ISS Program requirements for a standard mission preparation process. This template is defined in SSP 57057.

A payload-unique ISS Program PIM Schedule will be developed on a flight and increment-specific basis for initial and subsequent flights. The schedule will be reviewed and updated monthly. This schedule will be managed by the PIM, in coordination with the PD and ISS Program Integration team. The Common Schedule Database (CSD) tool will be used to gather the schedule data. Issues will be elevated to the Payload Mission Integration Team (PMIT) for resolution, as required.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

APPENDIX A - ACRONYMS AND ABBREVIATIONS

ARC	Ames Research Center
ASC	Aisle Stowage Container
C&DH	Command and Data Handling
CBT	Computer-Based Trainer
CDR	Critical Design Review
CEIT	Crew Equipment Interface Test
c.g.	center of gravity
CITE	Cargo Integration Test Equipment
CM	Configuration Management
CoFR	Certificate of Flight Readiness
CSD	Common Schedule Database
CTC	Crew Training Coordinator
DFRC	Dryden Flight Research Center
DIMS	Digital Imagery Management System
DQA	Data Quality Assurance
EAR	Export Administration Regulations
EEOM	Early End of Mission
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EOM	End of Mission
ETOV	Earth-To-Orbit Vehicle
EVA	Extravehicular Activity
EXPRESS	EXpedite the PRocessing of Experiments to the Space Station
FCR	Flight Control Room
FDF	Flight Data File
ft^3	cubic foot
GFE	Government Furnished Equipment
GPVP	Generic Payload Verification Plan
GRC	Glenn Research Center
GSE	Ground Support Equipment
GSP	Ground Support Personnel
HMST	Hazardous Materials Summary Table
HRMRB	Human Research Multilateral Review Board
I-	Increment minus
IACUC	Institutional Animal Care and Use Committee
ICD	Interface Control Document
IDD	Interface Definition Document
IGA	Intergovernmental Agreement
IOP	Increment Operations Plan

IP	International Partner
IRB	Institutional Review Board
IRD	Interface Requirements Document
ISPR	International Standard Payload Rack
ISS	International Space Station
iURC	interim User Requirements Collection
IVA	Intravehicular Activity
JIP	Joint Integration Plan
JSC	Johnson Space Center
kg	kilogram
KSC	Kennedy Space Center
Ku-Band	15.250 to 17.250 Gigahertz
L-	Launch minus
L&L	Launch and Landing
lbm	pounds mass
LSE	Laboratory Support Equipment
m^3	cubic meter
Mbps	Megabits per second
MCC-H	Mission Control Center - Houston
MDD	Mate/Demate Device
MDK	Middeck
MDM	Multiplexer/Demultiplexer
MIP	Mission Integration Plan
MORD	Medical Operations Requirements Documents
MPLM	Multi-Purpose Logistics Module
MSFC	Marshall Space Flight Center
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
OMS	Orbital Maneuvering System
OPF	Orbiter Processing Facility
OPMS	Online Project Management System
PALS	Program Automated Library System
PCB	Payloads Control Board
PD	Payload Developer
PDL	Payload Data Library
PDR	Preliminary Design Review
PDRP	Payload Display Review Panel
PDSS	Payload Data Services System
PEP	Payload Executive Processor
pH	Measure of acidity
PIA	Payload Integration Agreement

PILS	Payload Integrated Library System
PIM	Payload Integration Manager
PIMS	Payload Information Management System
PL OOS	Payload On-Orbit Operations Summary
PMIT	Payload Mission Integration Team
POI	Payload Operations Integration
POIC	Payload Operations Integration Center
POIWG	Payload Operations Integration Working Group
PRCU	Payload Rack Checkout Unit
PSE	Payload Support Equipment
PSRP	Payload Safety Review Panel
PTC	Payload Training Capability
PTCS	Payload Test and Checkout System
PTI	Payload Training Integrator
PUDG	Payload User Development Guide
R+	Return plus
RM&QA	Reliability, Maintainability, and Quality Assurance
RPO	Research Program Office
SCA	Shuttle Carrier Aircraft
SLF	Shuttle Landing Facility
SPIA	Standard Payload Integration Agreement
SRB	Solid Rocket Booster
SSE	Station Support Equipment
SSMTF	Space Station Mockup and Trainer Facility
SSP	Space Shuttle Program
SSPF	Space Station Processing Facility
SSTF	Space Station Training Facility
SVP	Structural Verification Plan
SWG	Structures Working Group
T-	Time to launch minus
TBD	To Be Determined
TBR	To Be Resolved
TIP	Training Implementation Plan
TSC	Telescience Support Center
TST	Training Strategy Team
URC	User Requirements Collection
U.S.	United States
USOC	United States Operations Center
V	Verification
VITO	Vehicle Integration Test Office

W	Watt
WORF	Window Observational Research Facility

APPENDIX B

GLOSSARY OF TERMS

APPENDIX B - GLOSSARY OF TERMS

ACCOMMODATIONS

Applies to ETOV or ISS physical locations where utilization or system items are stowed or installed.

AISLE STOWAGE CONTAINER

The Aisle Stowage Container (ASC) is designed to provide additional stowage volume transport capability inside the MPLM and may include oversized hardware that cannot be transported inside a standard transportation rack.

ALLOCATION

The portioning of resources and accommodations between the ISS payload/experiment users and ISS systems.

ASCENT

The period of time from Solid Rocket Booster (SRB) ignition through the establishment of a stable orbit (typically post-Orbital Maneuvering System (OMS) second burn).

COMPLEX OPERATIONALLY DEPLOYED PAYLOAD

Any pressurized payload not associated with a specific facility class or rack-level pressurized payload, nor with WORF or EXPRESS programs. Also, it has interfaces with ISS that are more extensive than what would classify a payload as a small payload.

DATA SETS

Data Sets contain the engineering, integration, and operational details required and agreed-upon by the implementing organizations. Data Sets define, on an increment and flight-specific basis, the engineering, integration, and operational details of the requirements in the unique PIA Increment Addendum. Data Sets will be updated as agreed to by the implementing organizations to meet increment and flight-specific needs.

DESCENT

The period of time from start of preparation for entry through wheel stop.

EARLY ON-ORBIT

The time from docking to completion of payload transfer. The period of time between the completion of ascent and the start of descent.

EXPRESS RACK

The EXPRESS rack provides standard accommodations and services for subrack science payloads which will allow them to access the research capabilities of the ISS. The EXPRESS racks consist of an International Standard Payload Rack (ISPR) which has been modified with power, data, and cooling subsystems which support the small locker and drawer (subrack) type payloads.

FACILITY CLASS PAYLOADS

A long-term or permanent ISS resident that provides services and accommodations for experiments in a particular science discipline.

FLIGHT

The time phase and the sequence of events that take place between liftoff and entry/landing of an ETOV.

INCREMENT

A specific time period into which various assembly, discipline research, testing, logistics, maintenance, and other ISS system operations and utilization activities are grouped. Currently the increments are defined by crew rotation.

INTEGRATED RACK PAYLOAD

A payload which is considered a subrack payload and will be located in a rack, such as the EXPRESS Rack.

INTERNATIONAL STANDARD PAYLOAD RACK

The ISPR accommodates approximately 55.7 cubic feet (ft^3) (1.58 cubic meter (m^3)) and 56.3 ft^3 (1.59 m^3) of payload equipment with and without the center posts installed, respectively. The rack accommodates up to 804 kilograms (kg) of payload equipment with structural augmentation during launch/landing and ground handling.

ISPR TRANSPORTATION RACK STANDARD STOWAGE TRAYS

The standard stowage units are modular trays which are installed in the standard transportation stowage racks. There are 11 different configurations of the trays.

ISS PROGRAM-FUNDED SSP SERVICES

Those services or tasks outside the scope of the standard SSP services but that NASA performs for a customer. These services are commonly performed for individual payloads to accomplish complex or unique mission requirements. Funding sources/costs of these services are to be negotiated by the ISS program, agree to by the SSP, and documented as required in the flight-unique MIP.

LABORATORY SUPPORT EQUIPMENT

Laboratory Support Equipment (LSE) are devices that are shared on a non-interference basis by multiple research users. LSE varies in size and complexity from a simple thermometer to full size ISPR containing a refrigerator/freezer.

OFFLINE

Offline refers to payload standalone activities or procedures initiated and performed by the PD to checkout or prepare hardware prior to turnover to KSC.

ONLINE

Online refers to integrated activities or procedures initiated and performed by KSC to integrate payload hardware and to perform a functionality test after payload turnover to KSC.

ON-ORBIT

The period of time between completion of ascent and the start of descent.

PAYLOAD DEVELOPER

The engineering team/principal investigator or organization responsible for the development and management of the payload.

PAYLOAD SUPPORT EQUIPMENT

Payload Support Equipment (PSE) is equipment that is to be used for a specific payload. It is provided by the specific payload and is not available for multi-use.

RACK LEVEL PAYLOAD

The rack as a facility or non-integrated container is the Rack Level Payload. Once the Rack Level Payload is joined with the subrack payloads, it becomes an Integrated Rack Payload.

REFRIGERATORS AND FREEZERS

The ISS will have several different types of refrigerator/freezers onboard that will be available for sample thermal stowage by PDs and experimenters.

RESOURCES

This is the term used to identify a particular subset of ISS on-orbit capabilities used in support of system and payload operations. Resources include but are not limited to power, crew time, etc.

SHUTTLE MIDDECK ACCOMMODATIONS

Modular lockers are available on the Space Shuttle to accommodate PD experiments and experiment hardware.

SSP SERVICES

Those services provided to all customers for transportation of payloads to and from the ISS.

STATION SUPPORT EQUIPMENT

Station Support Equipment (SSE) are devices/equipment which are owned by the Station. Payloads may request use of devices/equipment prior to launch of the payload. The use of the SSE will be negotiated through the LSE PIM.

SUBRACK LEVEL PAYLOAD

A subrack level payload is one of several payloads that are located in an integrated rack, such as the EXPRESS Rack. These payloads are part of the combined rack payload and must meet the subrack development/integration schedules provided by the rack level payload.

TRANSPORT RACK PAYLOAD

Transport racks were developed to be located on the Shuttle for the sole purpose of transporting payloads to and from the ISS. Payloads being transported from the ground to onboard ISS or from onboard ISS to the ground using these transport racks are considered transport rack payloads during the transportation phase.

APPENDIX C

OPEN WORK

APPENDIX C - OPEN WORK

Table C-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE C-1 TO BE DETERMINED ITEMS

Number	Description	Section	Assignee	Due Date	Status

Table C-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

TABLE C-2 TO BE RESOLVED ISSUES

Number	Description	Section	Assignee	Due Date	Status
6-2	Baseline Data Collection at Russian launch/landing sites is TBR.	6.6	I. Savelev	12/01	Ongoing assessment

APPENDIX D

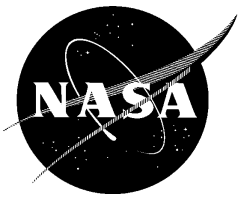
PAYLOAD INTEGRATION AGREEMENT TEMPLATE

Payload Integration Agreement for {Payload Name}

International Space Station Program

{DATE}

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas



REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (Reference per SSCD XXXXXX, EFF. XX-XX-XX)	XX-XX-XX

PREFACE

PAYLOAD INTEGRATION AGREEMENT FOR {PAYLOAD NAME}

Appendix D of the Standard Payload Integration Agreement (SPIA) presents the guidelines to implement a co-signed Payload Integration Agreement (PIA) between the Payload Developer (PD) or Appropriate Office and the ISS Program Payloads Office manager as the binding agreement for meeting and implementing the latest technical integration requirements and management processes required to fly a payload on International Space Station (ISS).

[Any instructional information contained in this PIA template is italicized and enclosed in brackets [example]. Information to be supplied is enclosed in braces and underlined {example}*. All instructional information will be removed for the payload-unique PIA.]*

This PIA is applicable to all payloads that will be integrated into the ISS including: Program-funded payloads, all non-funded ISS Program payloads, all payloads whose integration is managed by the ISS Program, and all International Partner (IP) barter agreement payloads.

The PIA with its applicable SPIA defines the management agreements by both parties to the SPIA. This PIA results in: (1) a co-signed PIA that will simply address management agreements where they deviate from the SPIA; (2) the PIA replaces the previously implemented Payload Integration Agreement Main Volume, and the PD will no longer be required to develop or submit this book; (3) SSP 57060, Payload Integration Agreement Increment Addendum Blank Book for Pressurized Payloads, becomes a separate standalone document; and, (4) the PIA provides direction to the applicable documentation, so that the PD shall be in compliance with the latest revision of the SPIA.

The format for each subsequent PIA will be essentially a duplicate of the original PIA. However, only those sections requesting a requirements deviation, a unique payload change, or new ISS resources will require updating. Each successive PIA update takes precedence.

The sections below introduce and address each section of the PIA requirements as they vary depending on the payload.

INTERNATIONAL SPACE STATION PROGRAM

PAYLOAD INTEGRATION AGREEMENT FOR {PAYLOAD NAME}

CONCURRENCE

{DATE}

Name TITLE	ORG
SIGNATURE	DATE
Name RPO, PD, OR APPROPRIATE OFFICE REPRESENTATIVE	ORG
SIGNATURE	DATE
Name CONFIGURATION MANAGEMENT REPRESENTATIVE	ORG
SIGNATURE	DATE

1.0 PURPOSE AND SCOPE

The Payload Integration Agreement (PIA) documents the agreements to manage and execute the roles and responsibilities of the technical integration requirements, processes, services, and resources between the {Payload Developer (PD) or Appropriate Office} and the International Space Station (ISS) Program for transportation services to and from ISS, and for on-orbit ISS resources and operations of the {Payload Name}. The effectivity of this co-signed PIA commences upon the last required signature of this document and continues through {select and insert either a calendar date or an ISS increment number}.

This PIA, with any unique agreements or exceptions, takes precedence over the ISS Program generic SSP 57059, Standard Payload Integration Agreement for Pressurized Payloads.

This PIA is applicable to all payloads that will be integrated into the ISS including: Program-funded payloads, all non-funded ISS Program payloads, all payloads whose integration is managed by the ISS Program, and all International Partner (IP) barter agreement payloads.

2.0 REQUIREMENTS

The {PD or Appropriate Office} shall be in compliance with the latest revision of the applicable SPIA. Payload compliance is considered the primary step toward certification of the payload for flight. It is the responsibility of the PD or Appropriate Office to verify compatibility of payload physical and functional interfaces with the applicable ISS interface agreements and documents. The ISS Program, however, intends to provide maximum flexibility in determining the manner or method to be used to accomplish this verification. All payload physical and functional compliance shall be accomplished prior to installation for flight. Similarly, the ISS Program is responsible for verifying ISS interface compliance prior to payload transportation. The payload shall be in compliance with this PIA, the applicable SPIA, and any updates directed by the ISS Payloads Control Board (PCB). This PIA, with any unique exceptions, takes precedence and/or supersedes those requirements baselined in the applicable SPIA.

The PIA requirements source for the payload basic PIA Increment Addendum, Payload Data Sets, Interface Requirements Document, and other applicable technical requirements and processes is baselined in SSP 57059*,* Section 2.1, Applicable Documents. The ISS Program management requirements documentation is described in SSP 50431, Space Station Program Requirements for Payloads.

{If an IP payload is applicable, add this paragraph.} Reference the IP/ISS Program Joint Integration Plan (JIP) for unique project development management agreements and requirements.

3.0 JOINT AGREEMENTS DOCUMENTATION

The joint agreements between the {PD or Appropriate Office} and the ISS Program are documented in {select and insert the appropriate SSP 52000-XXX-XXX document here}, the SPIA (requirements), the PIA Increment Addendum (flight/mission specific agreements), the Payload Data Sets (detailed technical requirements), the Interface Control Documents (hardware and/or software interface definition to ensure compatibility with the ISS and Space Shuttle), and the Payload Verification Plan (verification activities to satisfy requirements).

4.0 PAYLOAD DESCRIPTION

[The {PD or Appropriate Office} *shall provide in this section a top-level description that describes the basic function(s) and research utilization objectives of the payload.]*

5.0 UNIQUE AGREEMENTS, CONSTRAINTS, OR SERVICES

[The {PD or Appropriate Office} *shall provide in this section any unique deviations required from the management responsibilities or technical agreements as described in the applicable baselined SPIA and/or PIA Increment Addendum.]*

6.0 ATTACHMENT 1 - BASIC PAYLOAD HARDWARE AND DATA

[The {PD or Appropriate Office} *shall provide in Attachment 1 - Basic Payload Hardware and Data matrix, the functional payload mission and resource requirements and station interfaces to be used by the ISS Program to implement the technical integration requirements and processes between the* {PD or Appropriate Office} *and the ISS Program.]*

ATTACHMENT 1 - BASIC PAYLOAD HARDWARE AND DATA

Attachment 1 - Basic Payload Hardware and Data
Payload Title:
Payload Objectives:
Payload Mission Duration:

Payload Data	Resource Requirements
Payload On-Orbit Volume [ft^3(m^3)]	
Payload Up Mass [lbm(kg)]	
Payload Down Mass [lbm(kg)]	
Payload Up Volume [ft^3(m^3)]	
Payload Down Volume [ft^3(m^3)]	
Total Resupply Rate-per-Year Up Mass [lbm(kg)]	
Total Resupply Rate-per-Year Down Mass [lbm(kg)]	
Total Resupply Rate-per-Year Up Volume [ft^3(m^3)]	
Total Resupply Rate-per-Year Down Volume [ft^3(m^3)]	
Continuous Power (W)	
Minimum Continuous Power (“keep alive/survival”) (W)	
EVA Crew Time (hours per year)	
IVA Crew Time (hours per year)	
Communications Downlink (Yes/No)/Mbps	
Communications Uplink (Yes/No)/Mbps	
Late/Early Access (launch/return/both/none)	
Support Equipment	
Co-location or Co-manifest Coordinated Payloads {Payload Name}	
Special Services Required (specify):	
Additional Remarks/Requirements (specify):	

GUIDELINES FOR COMPLETION OF ATTACHMENT 1 - BASIC PAYLOAD HARDWARE AND DATA

Information contained in this attachment permits the ISS Program to become familiar with the general payload requirements and develop preliminary resource requirements of the payload that will be used for resource and operations planning.

A. Payload Title - Enter the payload name.

B. Payload Objectives - Identify the major objectives for this payload program.

C. Payload Mission Duration - Indicate the number of hours, days, or years required to obtain the proper data.

D. Payload On-Orbit Volume (equivalent volume, cubic feet/cubic meters) - The volume required on-orbit for internal and external accommodations, including internal payload equipment stowage volume.

E. Payload Up Mass (pounds mass/kilograms) - The total payload and resupply mass to be launched in support of payload operations, including payload adapters, special flight support equipment, or logistics carriers, as appropriate.

F. Payload Down Mass (pounds mass/kilograms) - The total payload and resupply mass to be returned in support of payload operations, including payload adapters, special flight support equipment, or logistics carriers, as appropriate.

G. Payload Up Volume (equivalent volume, cubic feet/cubic meters) - The total payload and resupply volume to be launched in support of payload operations, including payload adapters, special flight support equipment, or logistics carriers, as appropriate.

H. Payload Down Volume (equivalent volume, cubic feet/cubic meters) - The total payload and resupply volume to be returned in support of payload operations, including payload adapters, special flight support equipment, or logistics carriers, as appropriate.

I. Total Resupply Rate-per-Year Up Mass (pounds mass/kilograms) - The total resupply mass to be launched in support of payload operations.

J. Total Resupply Rate-per-Year Down Mass (pounds mass/kilograms) - The total resupply mass to be returned in support of payload operations.

K. Total Resupply Rate-per-Year Up Volume (equivalent volume, cubic feet/cubic meters) - The total resupply volume to be launched in support of payload operations.

L. Total Resupply Rate-per-Year Down Volume (pounds mass/kilograms) - The total resupply volume to be returned in support of payload operations.

M. Continuous Power (kilowatts) - The maximum steady-state electrical power condition required for nominal payload operations.

N. Minimum Continuous Power - Minimum continuous power (“keep alive/survival”) is the lowest uninterrupted electrical power required by the payload to avoid payload damage or failure, in watts (W).

O. EVA Crew Time (hours per year) - Total crew time required per year for payload installation, activation, operations, on board training and scheduled maintenance.

P. Intravehicular Activity (IVA) Crew Time (hours per year) - Total crew time required per year for payload installation, activation, operations, onboard training and scheduled maintenance.

Q. Communications Downlink (Yes/No)/Mbps - The rate of data transmitted from the payload to the ground via the Orbiter or ISS and routed via the Command and Data Handling (C&DH) System in Megabits per second (Mbps).

R. Communications Uplink (Yes/No)/Mbps - The rate of data transmitted from the ground to the payload via the Orbiter or ISS and routed via the C&DH System in Mbps.

S. Late/Early Access (launch/return/both/none) - Late and/or early access services required for payload or payload resupply launch and return.

T. Support Equipment - List the Station support equipment and/or payload support equipment required to support payload operations (not applicable to unique remote payload user facilities).

U. Co-location or Co-manifest Coordinated Payloads {Payload Name} - List of ISS coordinated payload names, deletion of which will cause notification to the PD sponsoring this payload.

V. Special Services Required (specify) - List any anticipated or optional services required.

W. Additional Remarks/Requirements (specify) - Other resources required to support payload operations.